human female skin. It is concluded that aspalathin is found mostly distributed into the stratified layers of skin than in the receptor fluid phase.

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## Horizontal gene transfer in plants, how often and what does it mean?

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The release of whole plant genome sequences provides the opportunity to undertake genome wide analysis of integration of DNA of non-nuclear origin into the plant genome from either plastids or microbes and fungi. During endosymbiotic evolution, eukaryotic nuclear genomes have acquired numerous genes from the endosymbiotic organelles, which later evolved into the present chloroplasts and mitochondria and although most of this gene transfer occurred at an early stage of organelle evolution, functional gene transfer continues to occur in plants. Studies estimate the rate of transfer between the chloroplast and mitochondria to the nucleus to occur at the same rate, yet there are much more DNA of chloroplast origin in the nucleus of rice. There are also DNA of non-plant origin in the nucleus of rice, raising the question of just how frequent is horizontal gene transfer in the plant kingdom and what implications does this have?

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## Effect of alien plant invasion on riparian seed bank assembly rules

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Globally, riparian areas are particularly susceptible to invasion. Once invaded, riparian systems play a major role in the spread of invasive species throughout the landscape; particularly those species with high seed loads that are long-lived and able to build up in the soil to form extensive seed banks. Knowledge of seed bank composition assists in predicting the initial post-recruitment vegetation following a disturbance, be it natural (flood) or man-made (alien clearing) and can bear vital information for effective restoration of invaded rivers. Assembly rules are often used as tools for understanding the patterns that shape ecological communities. We investigated the impact of alien plant invasion on the composition of riparian seed banks and looked specifically at how their assembly rules become altered after invasion. Sampling was done along four main river systems in the south-western Cape, along different moisture gradients (dry, wet and transitional banks), slopes (mountain stream and foothill) and within different vegetation states (reference or invaded). All species that germinated from the soil seed bank samples were recorded and identified as close to species level as possible. Correspondence analyses were computed for the 20 most frequently occurring species on three different scales; landscape scale (between rivers), reach scale (between mountain stream and foothills sections) and habitat scale (between wet, dry and transitional bank zones). A clear pattern is evident *at all scales* showing close grouping within reference plots and greater species richness. Reference plots were tightly assembled and more closely related to each other than the scattered groupings shown in the invaded plots. Within reference plots the seed bank assembly rules are less affected by variables such as river, slope or zone. This study illustrates that once a riparian area has become invaded, the assembly rules are significantly altered as additional variability is introduced to the seed bank.

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## Disturbance and the frequency of root suckering in an invasive savanna shrub, *Dichrostachys cinerea*

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The ecology of clonal species has rarely been studied in savannas. *Dichrostachys cinerea*, a common invasive shrub in southern African savannas, forms root suckers. The effect of disturbance type and frequency on this form of clonal spread was examined. Small plants were excavated ($n=370$) at eleven sites, in the Hluhluwe-Imfolozi Game Reserve, exposed to different fire frequencies and grazing intensities and classified as either seedlings or root suckers. 55% were found to be root suckers. There was no significant effect of disturbance type and frequency on establishment from seeds versus root suckers. Even when burnt annually, *D. cinerea* continued to root sucker. Increasing atmospheric carbon dioxide levels may favour clonal species that have large underground carbon sinks. The combination of establishment from seeds and spread by root suckers makes this species a formidable native invasive woody shrub.

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